heating nor by shock. On account of its great stability towards oxidising agents, the author suggests the formula $C_6H_5.N \vdots NH$ as being the most probable.

THE additions to the Zoological Society's Gardens during the past week include two Tigers (*Felis tigris*, ♂, ♀) from India, presented by H.H. the Maharani Regent of Mysore; a Black-eared Marmoset (*Hapale jacchus*) from South-east Brazil, presented by Mrs. G. L. Bagnell; a Pine Marten (*Mustela martes*), British, presented by Mr. C. G. Beale; a Common Squirrel (*Sciurus vulgaris*), British, presented by Mr. Cecil Slade; a Yellow-cheeked Amazon (*Chrysotis autumnalis*) from Honduras, presented by Mr. S. Hankings; two Crimson-crowned Weaver Birds (*Euplectes flammiceps*) from West Africa, presented by Mrs. Charles Green; a Sharp-nosed Crocodile (*Crocodilus cataphractus*) from West Africa, presented by Mr. J. A. Robb; a Four-lined Snake (*Coluber quatuorlineatus*), European, presented by Mr. W. R. Temple; four Natterjack Toads (*Bufo calamita*), European, presented by Mr. Stanley S. Flower; two Great Wallaroos (*Macropus robustus*, ♂, ♀) from South Australia, three Wrinkled Terrapins (*Chrysemys scripta rugosa*) from the West Indies, deposited; an Adanson's Sternothere (*Sternothoerus adansoni*), a Common Chamæleon (*Chamaeleon vulgaris*) from the Soudan, received in exchange; a Burrhel Wild Sheep (*Ovis burrhel*), two Black-backed Gulls (*Larus marinus*), a Herring Gull (*Larus argentatus*), bred in the Gardens.

ERRATUM.—We are asked to state that in the report of Prof. S. Young's paper, read before the Physical Society on June 22, on the Law of Cailletet and Mathias, the words "1 per cent." (p. 215, col. 1, line 3) should be "0·1 per cent." The 0 was omitted from the report sent to us.

OUR ASTRONOMICAL COLUMN.

COMET GIACOBINI (1900 *a*).—Several observations have been made of this comet since its conjunction with the sun, but it is reported as faint. The following positions are an abridgment from the Ephemeris by Herr Ristenpart in *Astronomische Nachrichten*, No. 3636.

Ephemeris for 12h. Berlin Mean Time.

1900.	R.A.	Decl.
	h. m. s.	°
July 12 ...	22 29 5 ...	+46 25·9
14 ...	12 29 ...	46 50·9
16 ..	21 55 5 ...	47 5·1
18 ...	37 4 ...	47 7·1
20 ...	18 42 ...	46 55 9
22 ...	21 0 16 ...	46 30·8
24 ...	20 42 2 ...	45 51·8
26 ..	24 19 ...	45 0·0
28 ...	20 7 20 ...	43 56·4
30 ...	19 51 16 ...	+42 42·4

The comet attains its maximum north declination on the 18th, to the north-west of α Cygni, afterwards travelling in a south-westerly direction through Cygnus and Lyra.

WALTER PERCY SLADEN.

BY the death of Walter Percy Sladen, the world has lost one of the most lovable of men, and science an earnest devotee—a worker content to spare no effort could he but discover the truth.

Sladen was born on June 30, 1849, at Meerelough House, near Halifax, Yorkshire, and was educated at Hipperholme Grammar School, and afterwards at Marlborough under Dean Bradley. He came of an old Yorkshire family, who have been much respected for many generations; and ease and refinement of manner were among his marked characteristics, while the charm of his address endeared him to all with whom he came in contact.

He never attended a regular academic course of instruction in the branch of science in which he became eminent; his elementary training was self-acquired, and his leaning towards zoology innate. The definitive choice of the Echinoderma as the object of his life's work was of his own seeking, after much consideration; and in this he showed great force of character and a power of self-reliance which there was reason earlier to believe he possessed, for even before he entered Marlborough he evinced an unusual predisposition towards science, in founding for his boy friends a scientific society devoted more especially to the study of astronomy, in connection with which he became known among them as the "Astronomer Royal." Little did he think that he would in later life become for ten years a secretary of a leading scientific society, and that for eighteen he would conduct the affairs of a zoological research committee, as he did in his capacity as Secretary to the British Association Table of the Naples Station.

Sladen's scientific work, so far as his published memoirs and papers are concerned, extended over a period of seventeen years, 1877 to 1893. Of these there are thirty-four in all—twenty-one from his own hand, thirteen in conjunction with his intimate friend and adviser, the late Prof. Martin Duncan. Beyond these there stand to his record certain bibliographical notices and miscellanea. Of the thirty-four published works, fifteen of which he was sole, and four of which he was joint author, deal with the starfishes; and of the remaining fifteen, nine were conjoint, and devoted, with the exception of two, to fossil forms. Conspicuous among these are reports upon the collections made by the Geological Survey of India; and among those which he alone produced are Parts i. and ii. of the second volume of the Palæontographical Society's Memoirs on the Fossil Echinodermata, which were his last published works. They deal with the Cretaceous Asteroids, and appeared in the Society's volumes for 1890 and 1893. His first three papers deal with the remarkable creature *Astrophiura*, whose generic name is self-explanatory. The first, a brief description, was published in the *Proceedings of the Royal Society* for 1878; the other two, each containing a Latin diagnosis, in the *Zoologischer Anzeiger* and *Annals and Magazine of Natural History*, the year following. His remaining papers appeared in the *Annals* and the *Journal of the Linnean Society*, the publications of the Royal Society of Edinburgh, and elsewhere. They mostly deal with whole collections, and include reports on those made in the Arctic Region in 1875–1876, on those of the *Alert*, *Knight Errant* and *Triton*, as also those made in the Faroe Channel, the Korean Sea, and the Mergui Archipelago. In each Sladen produced good results, as in the discovery of genera such as *Micraster* and *Rhegaster*; and what more natural, therefore, than that he should have been entrusted with the working out of the Asteroids collected by H.M.S. *Challenger*, the report upon which was the crowning achievement of his life.

This magnificent work of 900 pp., with its accompanying atlas of 118 plates, ranks among the most masterly and exhaustive of the *Challenger* volumes. Before taking it seriously in hand, Sladen visited every museum in Europe (with one exception) which was known to contain starfishes of importance; and, as pointed out by the editor in its preface, it is a monograph of the whole group. The labour involved in its production was prodigious; and its interest is enhanced by the fact that the bulk of it was written between the hours of 9 p.m. and those of early morning, often after a day's occupation with other affairs. The extension of the family Pterasteridæ and the great addition to our knowledge of the deep-sea forms are its most salient characters; but we know not which to admire most, the body of the work, with its laborious descriptions of individual forms, or the supplemental part, in which there is given a list of every known species, with a record of its bathymetric distribution. Elementary student and expert stand alike indebted to him for this monumental work, indispensable to progress in the knowledge of the subject with which it deals. Generic names like *Benthaster* and *Marsipaster* are sufficiently significant in themselves. Proceeding to classification, Sladen made good use of the marginal and ambulacral plates, and his subdivision into the sub-classes *Euasteroidea* and *Palaeasteroidea*, with the ordinal divisions to which he was led, has withstood the test of time and become the adopted classification of the better text-books, as for example those of Lang and Gregory. In this his influence on the progress of science will live, and it is a matter of profound gratification that only a short time before his death

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he gave expression to the satisfaction this recognition afforded him.

Beyond this magnificent work and those papers more or less immediately associated with it, wholly taxonomic, Sladen produced others of a physiological and developmental order, as for example his Naples Station paper, on the structure and functions of the pedicellariæ, and that announcing his discovery of the "cribriform organ," and his papers on the apical plates of the Astrophiuroids, in which he was obviously in agreement with his friend, the late Dr. Herbert Carpenter, in the belief in a stalked ancestry of these. It has been said of his taxonomic work that his descriptions are protracted, and that he deals with specimens as species. There is, however, no reason to believe that he was using the term species in any but a purely conventional sense, without necessarily implying any fixed inter-relationships; and his painstaking accuracy of description was the outcome of an excessive honesty of purpose and desire for thoroughness, in which he was altogether exemplary. There never lived a man with a truer sense of honour.

Some ten years ago Sladen had a bad attack of influenza, followed at intervals by several similar visitations, which unfitted him for serious scientific work, but he always hoped to get better and to take it up again. The last winter was passed in Devonshire with very beneficial results, and he might be said to have been in his usual health when two months ago he started with his wife for Rome. But the wish to return to work was not to be fulfilled; after spending six weeks in Rome he journeyed to Florence, and there after a week of rather active sightseeing, on June 11, he was taken with a fainting fit, and though he quickly recovered consciousness and declared his intention of going to Como that very night, within half an hour he passed away by failure of the heart's action.

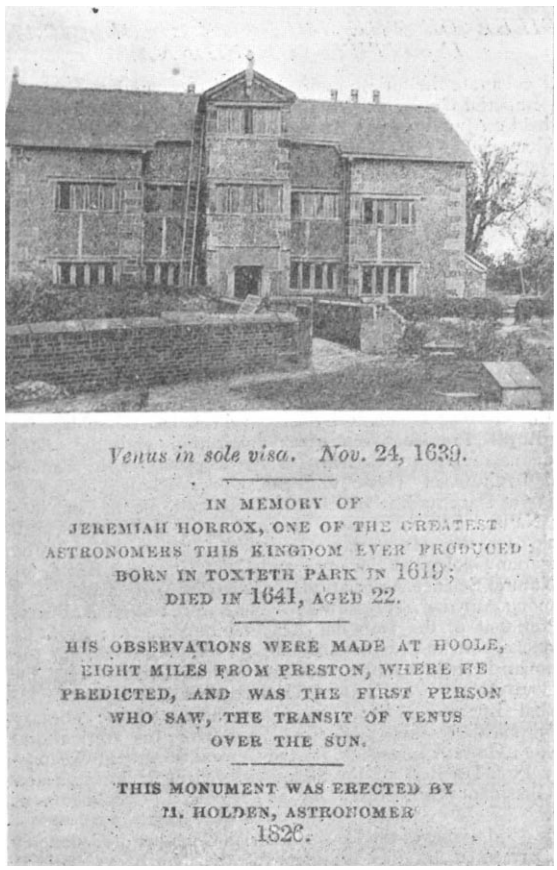
He was a Fellow of the Linnean, Zoological, and Geological Societies; for ten years Zoologic Secretary, and later a Vice-President of the former. In his secretarial capacity his genial nature found full sway, and his encouraging attitude to the younger men with whom he came in contact will ever be remembered. As a boy at school he was the captain wrestler. He was a good shot, though never a sportsman or member of a rifle corps, but he belonged to a private Guerilla Club in Yorkshire, of which he was sometime secretary.

In 1890 Sladen married Constance, elder daughter of the late Dr. W. C. Anderson, of York; and about two years ago he inherited from an uncle the estate of Northbrook, near Exeter, and there he has been laid to rest. It will be remembered that he recently gave the sum of 2000*l.* to insure the lives of the Yeomanry and Volunteers of his county going to the front in the Boer campaign; and this is but one among many of his generous acts, the majority of which are known only to the recipients. A loving husband, a trustworthy friend, whose advice was always sound, a keen sympathiser with suffering humanity, he has passed from us; but his memory and tender-loving influence for good will endure.

Among his scientific effects are a large library and some zoological collections of great value. Sladen had always a taste for old books, and one of his last expeditions was to a monastery at Subiaco, to examine some ninth century MSS. there preserved, and he had collected a goodly number of ancient MSS. and examples of early printing. His collection of Echinoderm literature is very complete; while, as to material, he leaves the collections of his friend, the late Herbert Carpenter, rich in Crinoids and other rare animal forms, which include, as a separate historic possession, the materials which formed the basis of the elder Carpenter's book on the microscope. These he purchased. There were also in his possession at the time of death a large series of Cretaceous Echinoderms, upon which he was contemplating a renewal of his Palæontographical Society's work; and the collection of Astrophiuroids of the *Albatross*, entrusted to his hands by Prof. A. Agassiz. There accompanied these a series of superb coloured drawings from the life, like those already published for the Holothuroidea of the expedition; and the very day of his death there reached him a letter from the same distinguished explorer, offering him the materials of his recent Australian cruise. It was Sladen's intention to have returned to these rich possessions; and we could desire no more fitting memorial to his work than that it might be possible to find and train a competent zoologist to continue that which he has left thus unfinished, on the lines on which he would have laboured, and to hand it down to posterity a completed record in his name. G. B. H.

JEREMIAH HORROCKS AND THE TRANSIT OF VENUS.

WE are indebted to the *Journal* of the Leeds Astronomical Society for 1899, which contains an interesting paper by Mr. A. Dodgson, on the life and work of the illustrious young astronomer, Jeremiah Horrocks. This worthy was born in 1619, 281 years ago, in the reign of James I., at Toxteth, three miles from Liverpool. He received his early education there, but on reaching the age of fourteen, he entered as "sizar" at Emmanuel College, Cambridge. At seventeen he was enabled to become tutor at Toxteth, and two years later, *i.e.* in his nineteenth year, he was appointed curate at Hoole, near Preston. Soon after this he made his memorable astronomical observation of Venus, and only two years later was dead. The life of the young man at Cambridge, as traced by Mr. Dodgson, was one of persistent industry. Imbued at an early age with a love of studying natural phenomena, he was hampered at the outset



by the absence of instruction in mathematics and the scarcity of books. This difficulty of getting philosophical and scientific works is clearly shown by the fact that of the thirty-two volumes he possessed later, not one was published in England or written by an Englishman. Lansberg's works he could not make agree with his own observations, and later, having obtained those of Kepler through the advice of his friend Crabtree, of Manchester, he found that even they needed many corrections. His first results in astronomical research were in elucidation of the lunar theory. Sir Isaac Newton confirms that he was the first to state the ellipticity of the moon's orbit; he also stated the causes of "evection" and "annual equation." The experiment of the circular pendulum for illustrating the action of a central force is also due to him. Most interesting, however, is his successful prediction of the transit of Venus in November, 1639. Kepler had stated that the two next transits would occur in 1631 and 1761, but Horrocks found, during his revision of the tables he had in use, that another would take place, the slight

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